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MODEL 44-30

REMOTE DISPLAY
FOR 44R AND 4002R TEST SETS

Northeast Electronics Instruction Manual
A0044-30-600 Issue 2 March 1979

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SECTION 1

DESCRIPTION

1.1 This manual covers the Northeast Electronics Model 44-30 Remote Display. The remote display extends the digital test result readout of a host test set to a distance away from the test set itself. The remote display can be used with either the TTS 44R Transmission Test Set or the Model 4002R Transmission And Impulse Noise Distribution Test Set.

1.2 The remote display shows the numeric value of test results on 4-digit liquid crystal readout. Test identification and/or test result units are shown by light emitting diodes.

1.3 The readout display comprises a remote option board which is installed within the host test set plus a separate readout unit and interconnecting cable. The readout unit can be located up to 250 cable-feet from the host test set. (Actual cable length is specified by the customer at time of purchase.) A supplied hanger bracket permits the readout unit to be supported from frames or overhead structures. The hanger bracket attaches to the top, to the bottom, or to either side of the readout unit. A Model 8636 swivel bracket (available as an accessory) allows aiming of the readout unit in the vertical plane as well as in the horizontal plane.

SECTION 2

SPECIFICATIONS

2.1 The major specifications of the Model 44-30 Remote Display are listed in Table 2—1.

Table 2—1. Overall Specifications

Numeric Information	4-digit liquid crystal display (LCD) with polarity signs and decimal points.
Identification Information	6 light emitting diodes (LEDs) identify the test and/or unit of the displayed numeric value.
Maximum Cable Length	250 ft (76.2 m) (actual cable length specified by customer).
Host Test Sets	TTS 44R Transmission Test Set (rack-mount version) Model 4002R Transmission And Impulse Noise Distribution Test Set (rack-mount version).
Power	Supplied by host test set.
Physical	
Readout Unit Size	6¾ w x 4 5/8 h x 6 d inches (17.1 w x 11.7 h x 15.2 d cm)
Weight*	
☐ Readout Unit:	2 lb 1 oz (0.94 kg)
☐ Option PC Board:	7 oz (0.2 kg)
Environment	
Temperature	
☐ Operating:	0°C to 50°C (32°F to 122°F)
☐ Non-operating:	—40°C to 75°C (—40°F to 167°F)
Relative Humidity	10 to 95%

* Does not include interconnecting cable which is of customer-specified length, up to 250 feet.

SECTION 3

INSTALLATION

3.1 This section contains information necessary for installation of the Model 44-30 Remote Display. The information includes:

a. initial inspection,
b. remote option board installation,
c. readout unit installation, and
d. interconnection.

3.2 INITIAL INSPECTION

3.3 The Model 44-30 Remote Display was carefully inspected both mechanically and electrically before shipment. It should be free of defects and should be operating correctly when received. To confirm this, the remote display should be inspected for damage in transit. If damage has occurred, file a claim with the carrier.

3.4 REMOTE OPTION BOARD INSTALLATION

3.5 If the remote display was purchased together with either the TTS 44R or the Model 4002R, then the remote option board (pn C0044-30-010) has already been installed in the test set by Northeast Electronics. Proceed with the readout unit installation in paragraph 3.7.

3.6 When the remote display is purchased separately, the remote option board (pn C0044-30-010) must first be installed inside the host test set. To install the remote option board:

1. Remove the test set power supply assembly (refer to "preparation for calibration" in the maintenance section of the appropriate test set instruction manual).

2. Install the remote option board as shown in Figures 3—1 or 3—2.

3. Replace the test set power supply assembly.

3.7 READOUT UNIT INSTALLATION

3.8 The readout unit can be mounted in any one of four positions. Figure 3—3 shows how to install the readout unit.

3.9 The hanger bracket attaches directly to the readout case when top or bottom mounted. However, the readout case has only one set of captive threaded inserts located on the top of the case. To bottom-mount the readout unit:

1. Remove the readout chassis held in place by two knurled screws (located at the rear of the case).

2. Turn the case upside down.

3. Relocate the cable clamp.

4. Insert chassis back into case and secure with the knurled screws.

3.10 For side mounting, the bracket is secured to the chassis through the case. Each side of the chassis has one set of threaded inserts accessible through holes in the sides of the readout case.

3.11 The readout unit, when mounted with the supplied hanger bracket, can be aimed in the horizontal plane through 180 degrees. An accessory swivel bracket (Model 8636) allows the readout unit to be adjusted vertically as well as horizontally. The swivel bracket is available from Northeast Electronics as part number A0086-36-900.

3.12 INTERCONNECTION

3.12 After mounting the readout unit, connect the readout unit to the host test set with the supplied cable. Maximum cable length is 250 feet. Figure 3—1 shows how the cable is secured to the host test set. The same method is used for securing the cable to the readout unit.

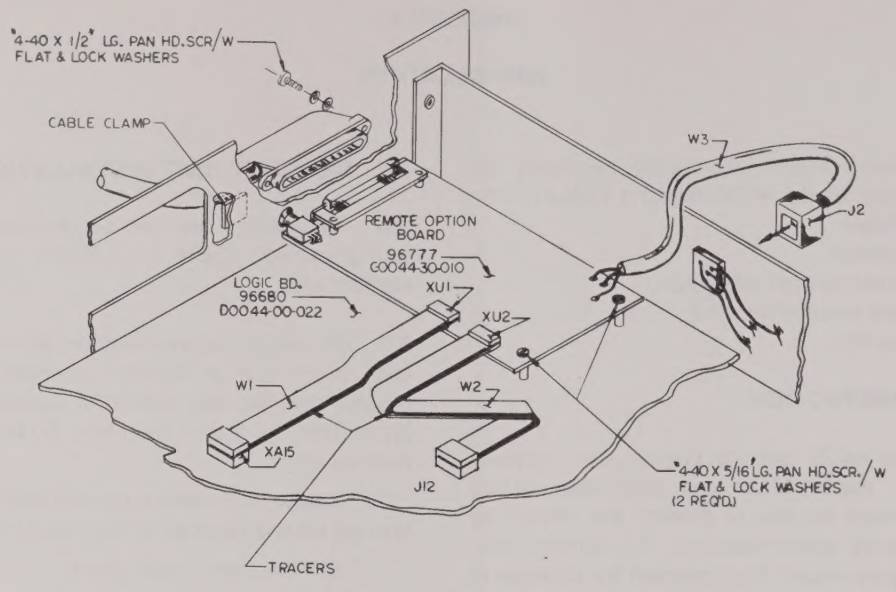


Figure 3—1. TTS 44R Remote Option Board Installation

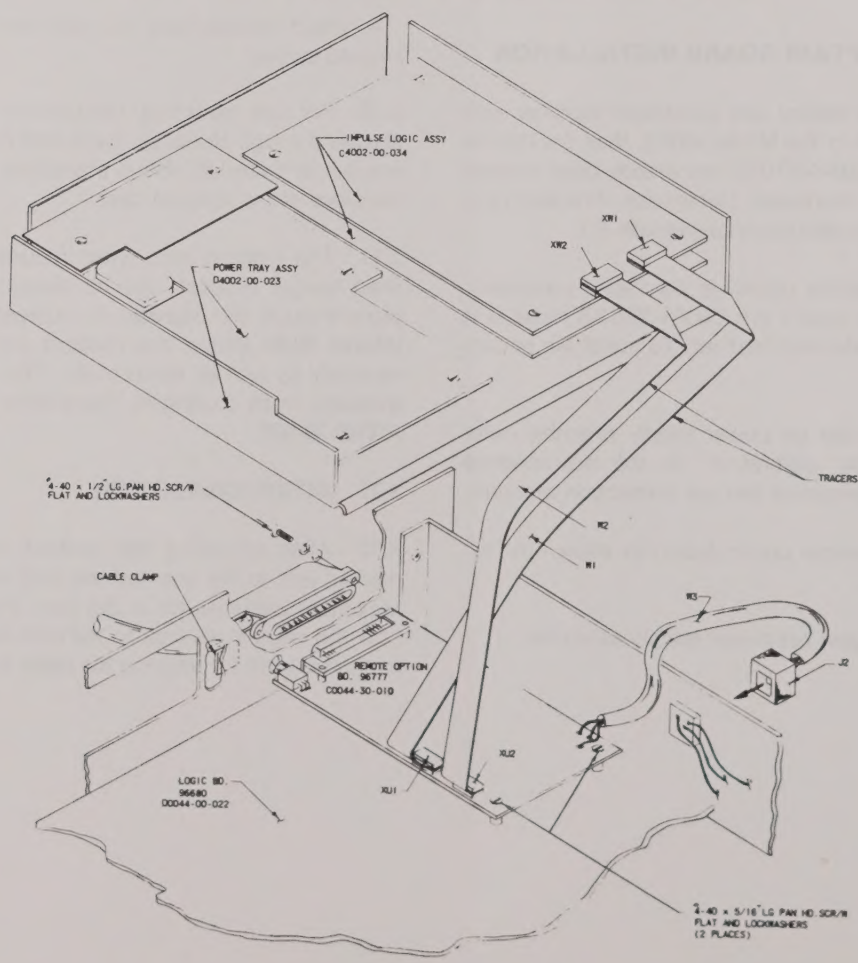
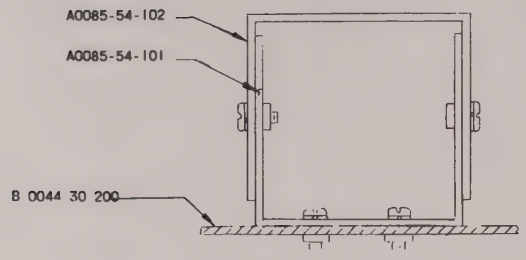
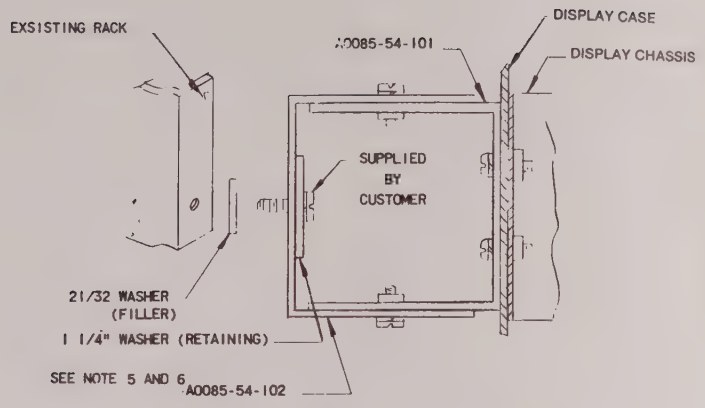


Figure 3—2. Model 4002R Remote Option Board Installation



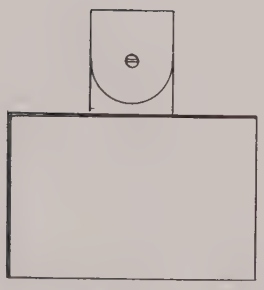
SECTION B-B

TYPICAL TOP OR BOTTOM MOUNTING HANGER BRACKET (SEE NOTE 4)

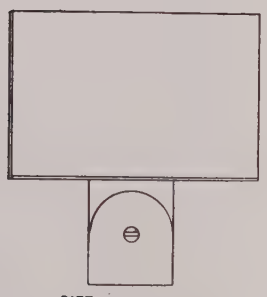


SECTION A-A

TYPICAL LEFT OR RIGHT SIDE MOUNTING HANGER BRACKET (SEE NOTE 3)



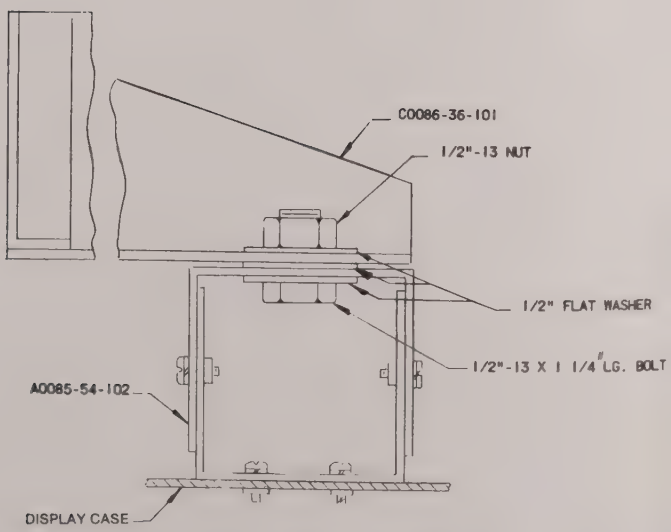
SIDE VIEW
TOP MOUNTING HANGER BRACKET



SIDE VIEW
BOTTOM MOUNTING HANGER BRACKET

6. PIVOT TO DESIRED ANGLE AND SECURE.
5. THIS SWIVEL BRACKET IS AVAILABLE. BRACKET ALLOWS THE READOUT UNIT TO BE POSITIONED AT ANY HORI— ZONTAL ANGLE WITHIN A 180° ARC.
4. ONE HANGER MOUNTING BRACKET IS SUPPLIED BY NORTHEAST AND CAN BE USED IN ANY OF THE FOUR MOUNTING POSITIONS.
3. READOUT UNIT SHOWN WITH LEFT SIDE MOUNTING HANGER BRACKET. READOUT UNIT CAN BE RIGHT SIDE MOUNTED.
2. READOUT UNIT SHOWN WITH TOP MOUNTING HANGER BRACKET. BY REMOVING UNIT FROM CASE AND TURN— ING CASE UPSIDE DOWN. UNIT CAN BE BOTTOM MOUNTED.
1. LOCATION OF READOUT UNIT TO BE DETERMINED AND SPECIFIED BY ENGINEER/CUSTOMER.

NOTES



SWIVEL ASSEMBLY (SEE NOTE 6)

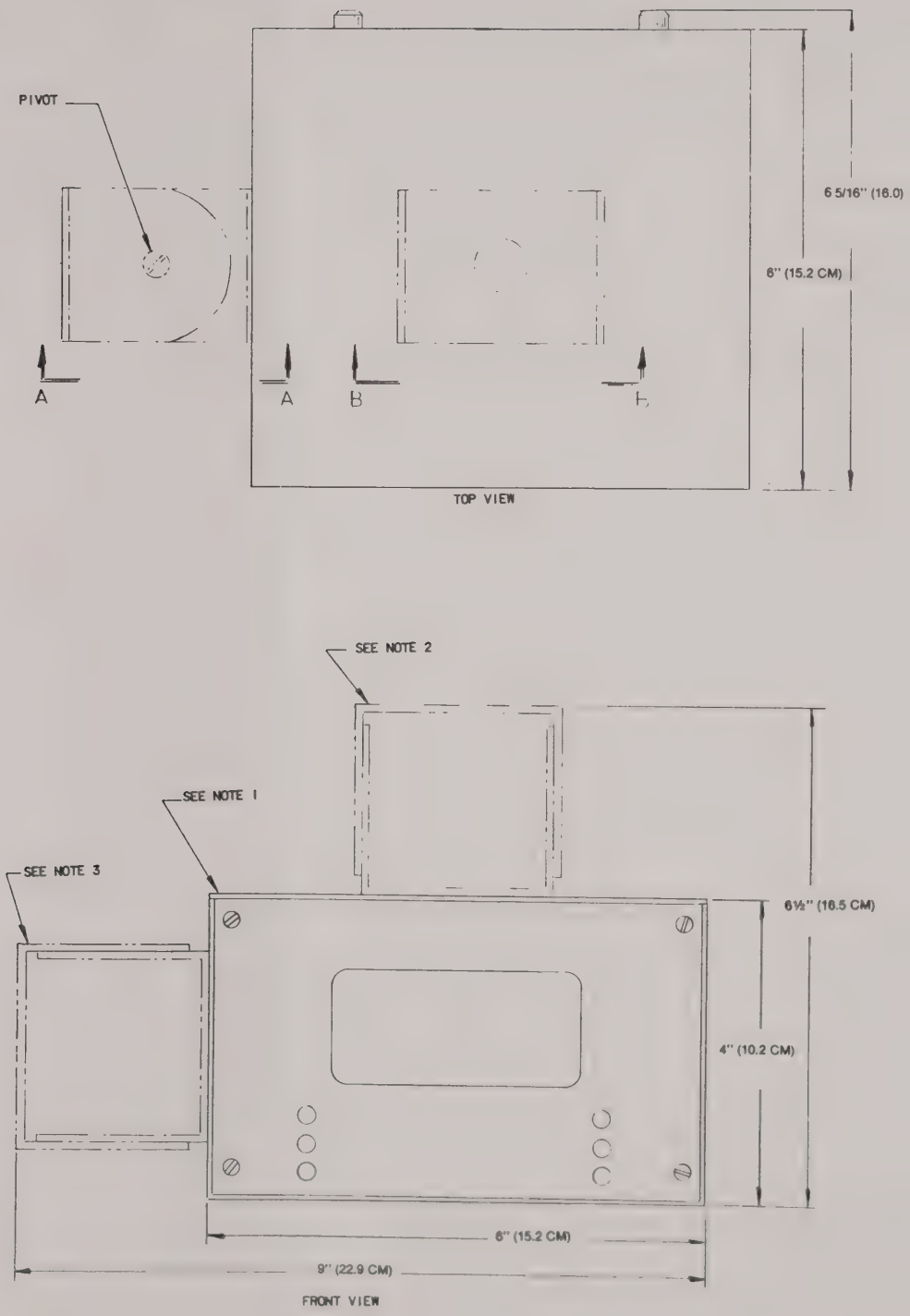


Figure 3—3. Readout Unit Installation

SECTION 4

OPERATION

4.1 This section provides the information needed for proper operation of the Model 44-30 Remote Display. The information is organized as follows:

a. Brief description of front panel **indicators;**
b. **Frequency autoranging** with the TTS 44R.

4.2 FRONT PANEL INDICATORS

4.3 Figure 4—1 shows the readout unit front panel indicators and Table 4—1 briefly describes the function of each indicator. A minus sign (—) with a blank display indicates that the input signal (tone level or noise level) to the host test set is below the test set's lower measurement limit. A plus sign (+) with a blank dispiay indicates that the input signal (tone level or noise level) exceeds the test set's upper measurement limit.

4.4 GENERAL OPERATING INSTRUCTIONS

4.5 The readout unit is a passive indicating device and has no operating controls. The readout option board used in the host test set does have an autoranging switch described in the following paragraph.

4.6 FREQUENCY AUTORANGING

4.7 Installing the remote option board in the TTS 44R Transmission Test Set gives the test set the capability of automatically selecting the frequency counting range (either up to 9999 Hz or up to 99.99 kHz). The FREQUENCY AUTORANGING switch (accessible at the rear of the test set), when set at AUTO, overrides the front panel KHZ/HZ switch and places the test set in autoranging mode during FREQ tests.

4.8 Setting FREQUENCY AUTORANGING switch at MAN allows the operator to select the frequency counting range with the front panel KHZ/HZ switch.

4.9 The Model 4002R test set has its own frequency autoranging capability. The Model 4002R does not have a control that allows an operator to manually select a frequency counting range. The FREQUENCY AUTORANGING switch has no effect on 4002R operation.

Table 4—1. Front Panel Indicators

REFERENCE DESIGNATION	INDICATOR	FUNCTION
U1	4-digit liquid crystal display (LCD).	Gives the test result value with the appropriate polarity and decimal points.
CR1	DBM light emitting diode	Identifies readout as a LEVEL test result with dBm units.
CR2	HZ light emitting diode	Identifies readout as a FREQ test result with Hz units.
CR3	KHZ light emitting diode	Identifies readout as a FREQ test result with kHz units.
CR4	DBRN light emitting diode	Identifies readout as a CKT NOISE or a NOISE WITH TONE test result with dBrn units.
CR5	NTG light emitting diode	Identifies readout as a NOISE-TO-GND test result with dBrn units.
CR6	IMP light emitting diode	(Model 4002R only) identifies readout as an IMPULSE NOISE test. The readout may refer to time remaining in minutes or to the number of counted hits above either the low, the medium or the high thresholds.

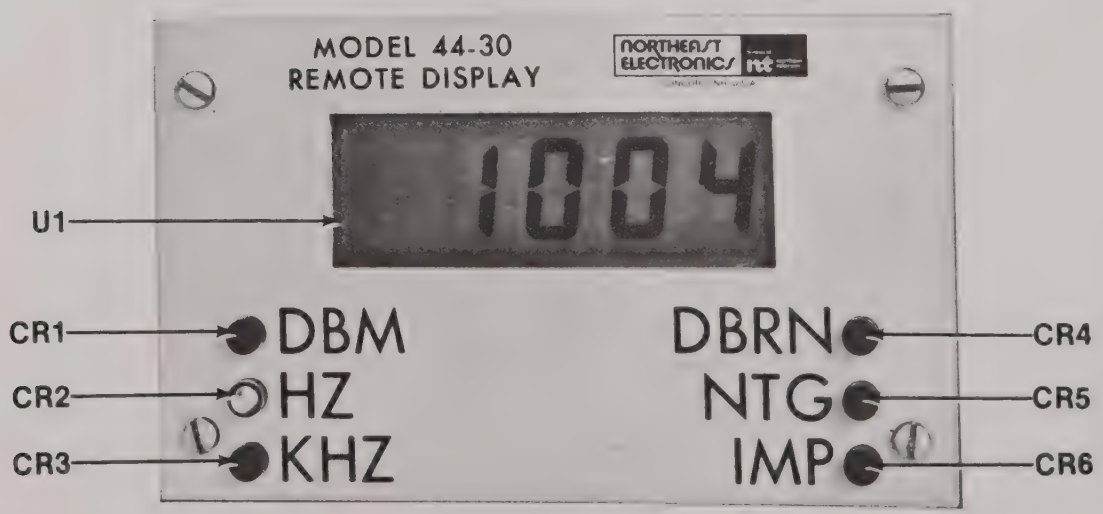


Figure 4—1. Front Panel Indicators

SECTION 5

THEORY OF OPERATION

5.1 This section contains theory of operation for the Model 44-30 Remote Display. An overall description is first presented at the block diagram level. Each major function of the remote display is then described in more detail for reference when troubleshooting the remote display.

5.2 OVERALL THEORY OF OPERATION

5.3 The remote display overall functional design is shown in block diagram form in Figure 5—1. Figure 5—1 shows that the remote option A3 board resides within the host test set and that the driver A2 and display A1 boards are located inside the readout unit.

5.4 The **remote option** board can be divided into two basic functions. The first function accepts display data from the logic board of the host test set and converts the display data for transmission to the readout. The second function adds a selectable frequency autoranging capability to the TTS 44R Transmission Test Set.

5.5 The **driver** board performs the following functions.

1. Buffers the mode signals which identify test results and/or test units.

2. Selects the appropriate +/— signs and decimal points.

3. Converts the 4-bit bcd data into seven-segment data for application to the liquid crystal display.

4. Generates the phase signal to drive the liquid crystal display.

5.6 The **display** board serves as a mounting surface and an interconnection board for the liquid crystal display and for the light emitting diodes.

5.7 REMOTE OPTION BOARD, DETAILED DESCRIPTION

5.8 As previously described, the remote option board converts display data for transmission to the readout unit and adds selectable frequency autoranging capability to the TTS 44R Transmission Test Set. Refer to Figure 5—1 and to Figure 7—4. The diode resistor networks at the input/output lines limit the currents and ensures that the voltages remain between —0.6V and +5.6V.

5.9 DISPLAY DATA CIRCUITS

5.10 The multiplexed bcd data (2^0 — 2^3) from the logic board passes through gates U8A — U8D only if $\overline{\text{BLANK}}$ is high. The data is stored into latches U9 through U12 by scan lines A through D. A low $\overline{\text{BLANK}}$ blocks the display data and forces the storage of "15" into a latch. The "15" will be interpreted as a blank by the seven-segment decoder circuit in the readout unit. The rc networks associated with buffers U7A—D shortens the data select pulses to ensure proper latching of the display data.

5.11 Flip-flop U13A/B and U14A/B form a latching divide-by-eight circuit which provides a DATA VALID pulse derived from the PE pulse. A high DATA VALID pulse indicates that the outputs of latches U9 — U12 are valid. This pulse is not presently used in the remote display.

5.12 Gates U1D, U4A/B, U5A—D, and U6A—D provide the correct mode labeling (identification of test results and/or test units), the +/— sign, the decimal point, and blanking of the display.

5.13 FREQUENCY AUTORANGING

5.14 The frequency autoranging circuit consists of gates U1A—C, U2A—D, U3A—D and flip-flops U15A/B. FREQUENCY RANGING switch S1, when set at AUTO, allows the autoranging to affect the TTS 44R Transmission Test Set. Frequency ranging occurs manually (via KHZ/HZ switch in TTS 44R) if the remote option board FREQUENCY RANGING switch is set at MAN. The Model 4002R Transmission And Impulse Noise Distribution Test Set has its own frequency autoranging circuit and the remote display frequency autoranging circuit has no effect.

5.15 See Figure 5—2 which shows a simplified diagram of the autoranging circuit together with the data counter. The autoranging circuit causes the data counter to automatically have a 1-Hz resolution for frequencies below 9999 Hz and a 10-Hz resolution for frequencies above 9999 Hz.

5.16 During a measurement cycle, gates U1C, U2A—D, and U3A—D sample either the $\overline{\text{co1}}$ or the $\overline{\text{co2}}$ data counter outputs at a 102.4 kHz sampling rate. The frequency ranger determines whether $\overline{\text{co1}}$ or $\overline{\text{co2}}$ will be monitored. If the monitored "carry-out" ($\overline{\text{co1}}$ or $\overline{\text{co2}}$)

signal goes low, then flip-flop U15A is set. After the measurement cycle, the state of flip-flop U15A is transferred into flip-flop U15B on the leading edge of PE. The trailing edge of PE then resets flip-flop U15A. A set flip-flop U15B applies a high KHZ/HZ to indicate a KHZ frequency range.

5.17 Should the monitored "carry-out" ($\overline{co1}$ or $\overline{co2}$) signal remain high during a measurement cycle, then flip-flop U15A remains reset. The reset state is transferred into flip-flop U15B by PE to force KHZ/HZ low. A low KHZ/HZ indicates a HZ frequency range.

5.18 In a HZ frequency range (KHZ/HZ = 0), the data counter is configured as a four-stage decade counter with a 1-Hz resolution. The "carry-out" ($\overline{co1}$) of U38 goes low if the accumulated count reaches or exceeds 9999 Hz. The low KHZ/HZ conditions gates U3A/C and U3B/U1C to invert and pass the state of $\overline{co1}$ only.

5.19 Similarly, a high KHZ/HZ configures the data counter into a five-stage decade counter. Only the outputs of the four most significant stages are displayed, thus the data counter has a 10-Hz resolution. The "carry-out" ($\overline{co2}$) of U39 goes low if the accumulated count reaches or exceeds 9.999 kHz. The high KHZ/Hz now conditions gates U3D and U3B/U1C to invert and pass the state of $\overline{co2}$ only.

5.20 DRIVER BOARD, DETAILED DESCRIPTION

5.21 The driver board performs four operations:

1. buffering,
2. +/− sign and decimal point selection,
3. bcd to seven-segment decoding, and
4. phase clock generation.

Refer to Figure 5−1 and to Figure 7−8. The diode resistor networks at the input lines limit the currents and ensure that the voltages remain between −6.0V and +5.6V.

5.22 BUFFERING

5.23 Buffers U1A−F isolate the inputs from transistors Q1−Q6. These open-collector transistors switch the display board light emitting diodes on and off.

5.24 +/− SIGN AND DECIMAL POINT SELECTION

5.25 Gates U2A-D and U3A-B combine +/− sign and blanking signals to apply plus, minus, and decimal point signals in accordance with Tables 5−1 and 5−2. These signals are clocked through exclusive or-gates U4A-D by the PHASE clock signal.

5.26 SEVEN−SEGMENT DECODING

5.27 Liquid crystal display drivers U5−U8 are single digit bcd-to-7-segment decoders. The square-wave PHASE clock at the DF1 inputs controls the 7-segment outputs. The selected segments have a square-wave output that is 180° out of phase with the PHASE clock. The non-selected segments have a square-wave output that is in phase with the PHASE clock.

5.28 PHASE CLOCK GENERATION

5.29 Gates U9A/B form an astable multivibrator whose frequency is set at approximately 70 Hz by resistor R7 and capacitor C1. Flip-flop U10A divides the 70-Hz frequency to apply a 35-Hz PHASE clock. Note that the PHASE clocks the +/− SIGN and DP signals through exclusive or-gates U4A−D. Therefore an asserted +/− SIGN and DP signal will be 180° out of phase with the PHASE clock while an unasserted signal will be in phase.

5.30 DISPLAY BOARD, DETAILED DESCRIPTION

5.31 The display board holds the liquid crystal display and the light emitting diodes. See Figure 7−6. A segment on the liquid crystal display turns on only if the signal applied to an input is 180 degrees out of phase with the PHASE clock. The light emitting diodes turn on to identify the test results and/or test units of the numeric value shown on the liquid crystal display.

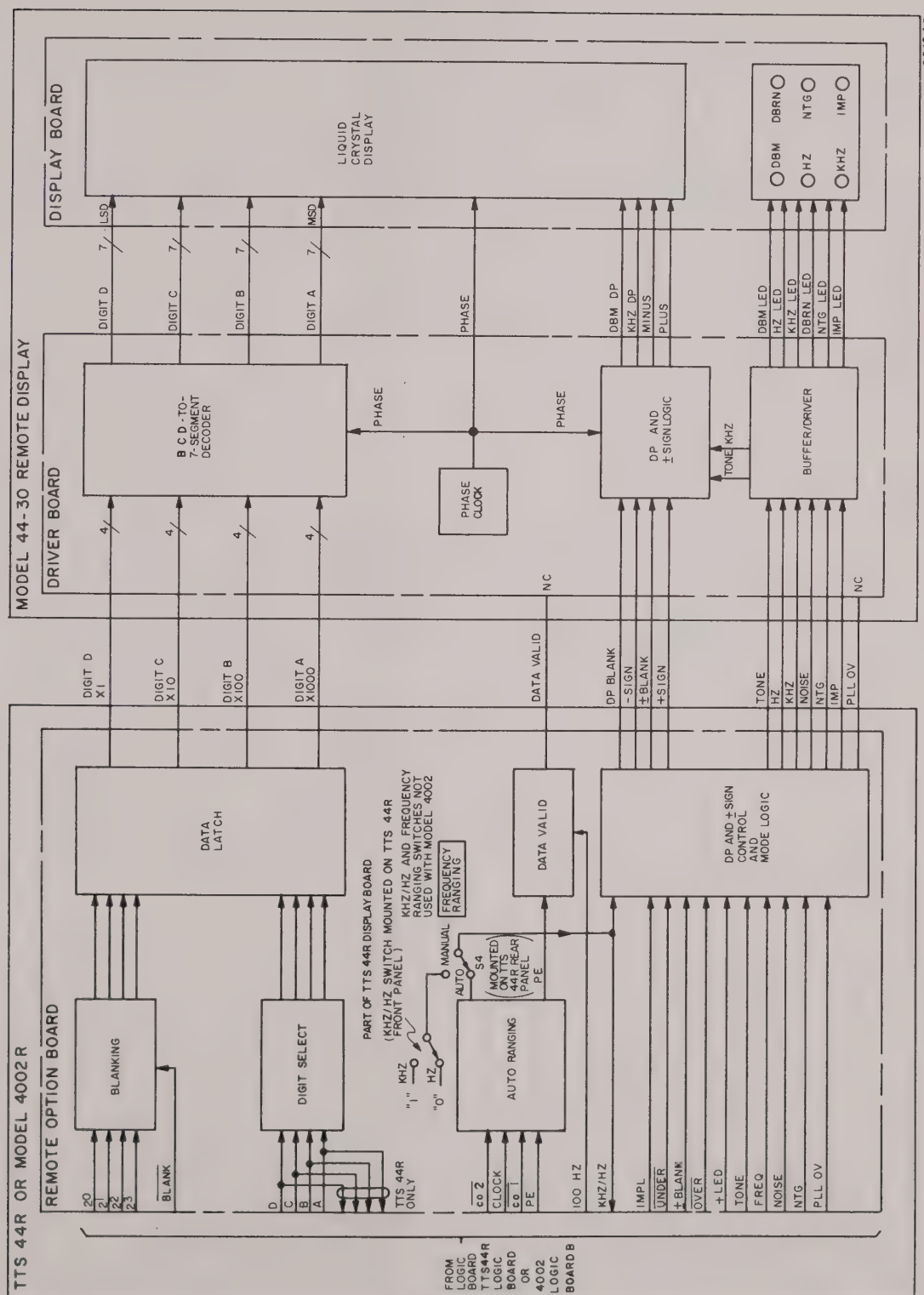


Figure 5—1. Model 44-30 Remote Display Block Diagram

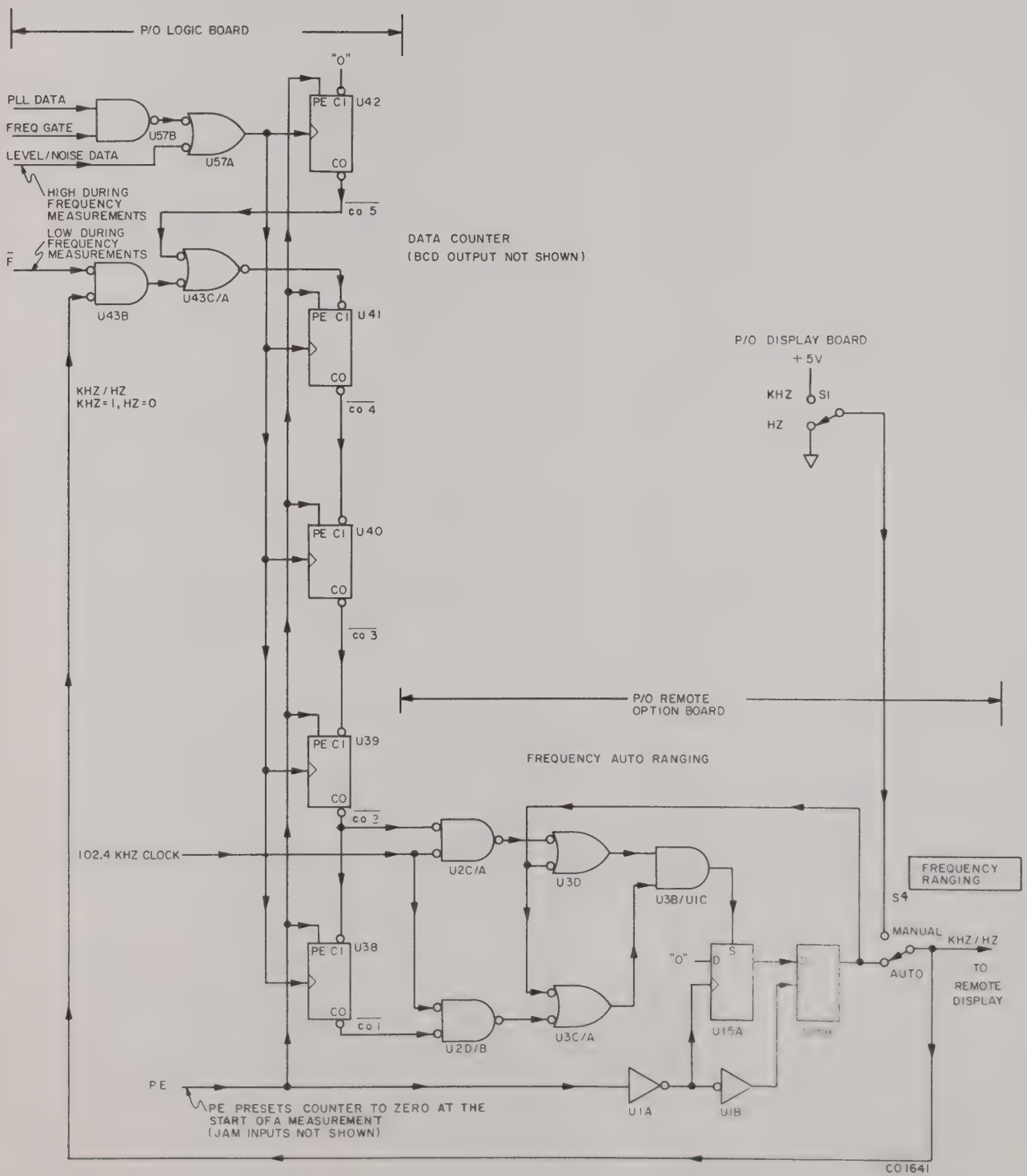


Figure 5—2. Frequency Autoranging Simplified Diagram

Table 5—1. +/— Sign Selection

INPUTS			OUTPUTS	
— SIGN	± BLANK	+ SIGN	MINUS	PLUS
1	1	0	1	0
1	1	1	1	1
0	1	1	0	1
X	0	X	0	0

NOTE
X = don't care

Table 5—2. Decimal Point Selection

INPUTS			OUTPUTS	
TONE	DB BLANK	KHZ	DBM DP	KHZ DP
1	1	0	1	0
0	1	1	0	1
X	0	X	0	0

NOTES

X = don't care
TONE and KHZ cannot be both high at the same time.

SECTION 6

MAINTENANCE

6.1 The Model 44-30 Remote Display requires no periodic alignment. Sufficient information is provided in the Theory Of Operation, Section 4, to troubleshoot the remote display should it fail to operate properly.

SECTION 7

DIAGRAMS

7.1 This section contains assembly diagrams, parts location diagrams, and schematic diagrams for the Model 44-30 Remote Display.

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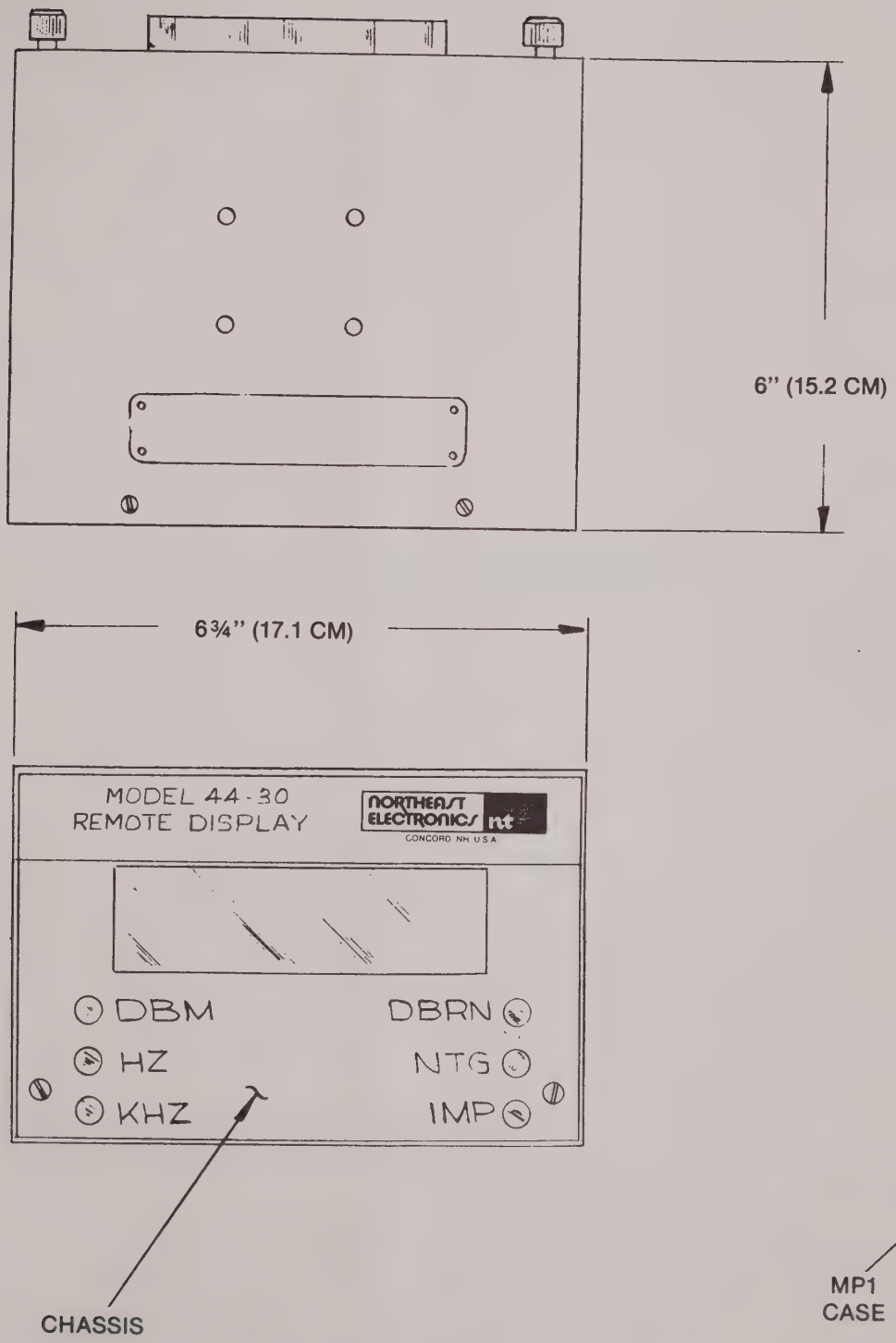

6" (15.2 CM)
MP2
HANGER
BRACKET
6¾" (17.1 CM)
MODEL 44-30
REMOTE DISPLAY
NORTHEAST
ELECTRONICS
CONCORD NH U.S.A
DBM
HZ
KHZ
DBRN
NTG
IMP
CHASSIS
MP1
CASE

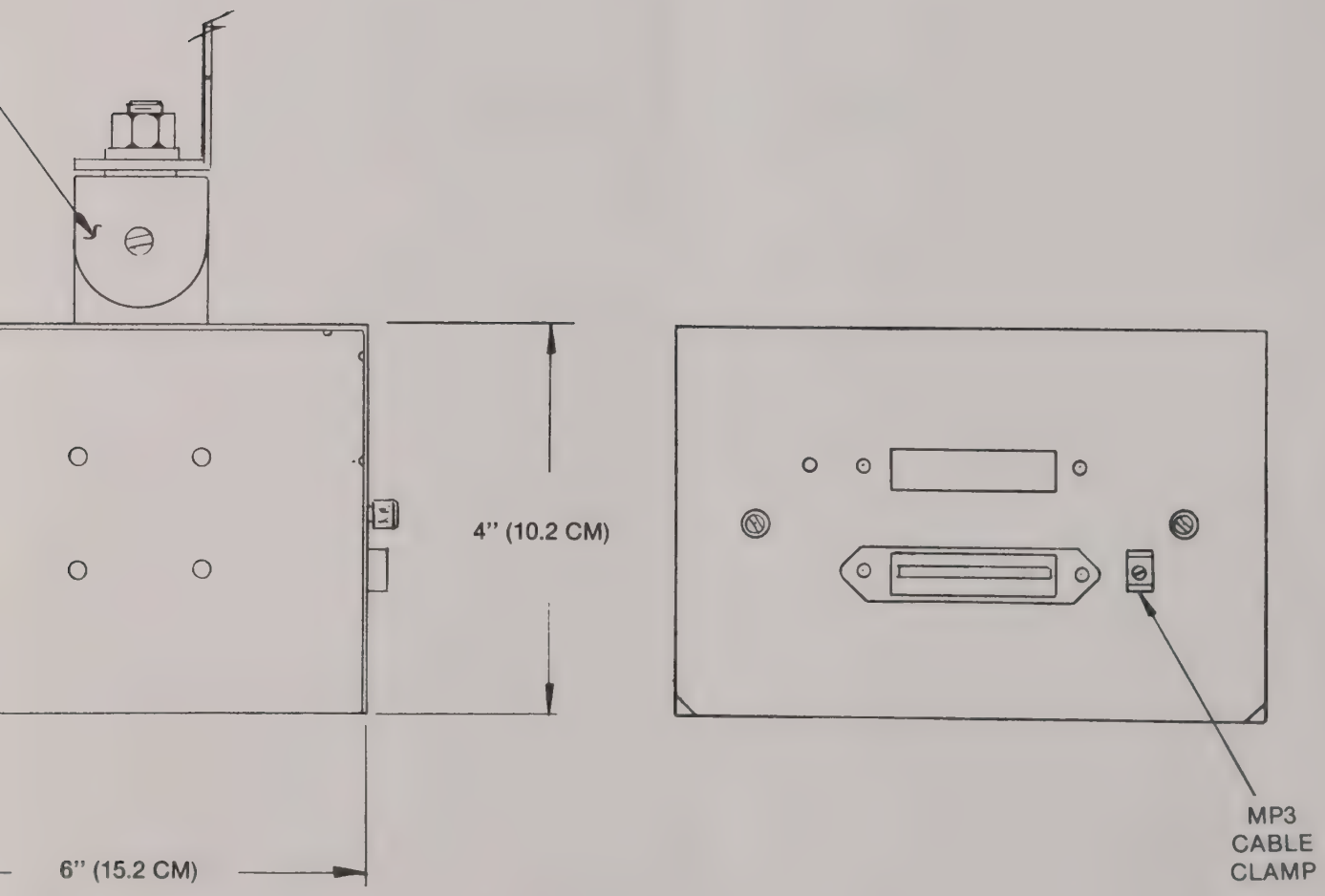
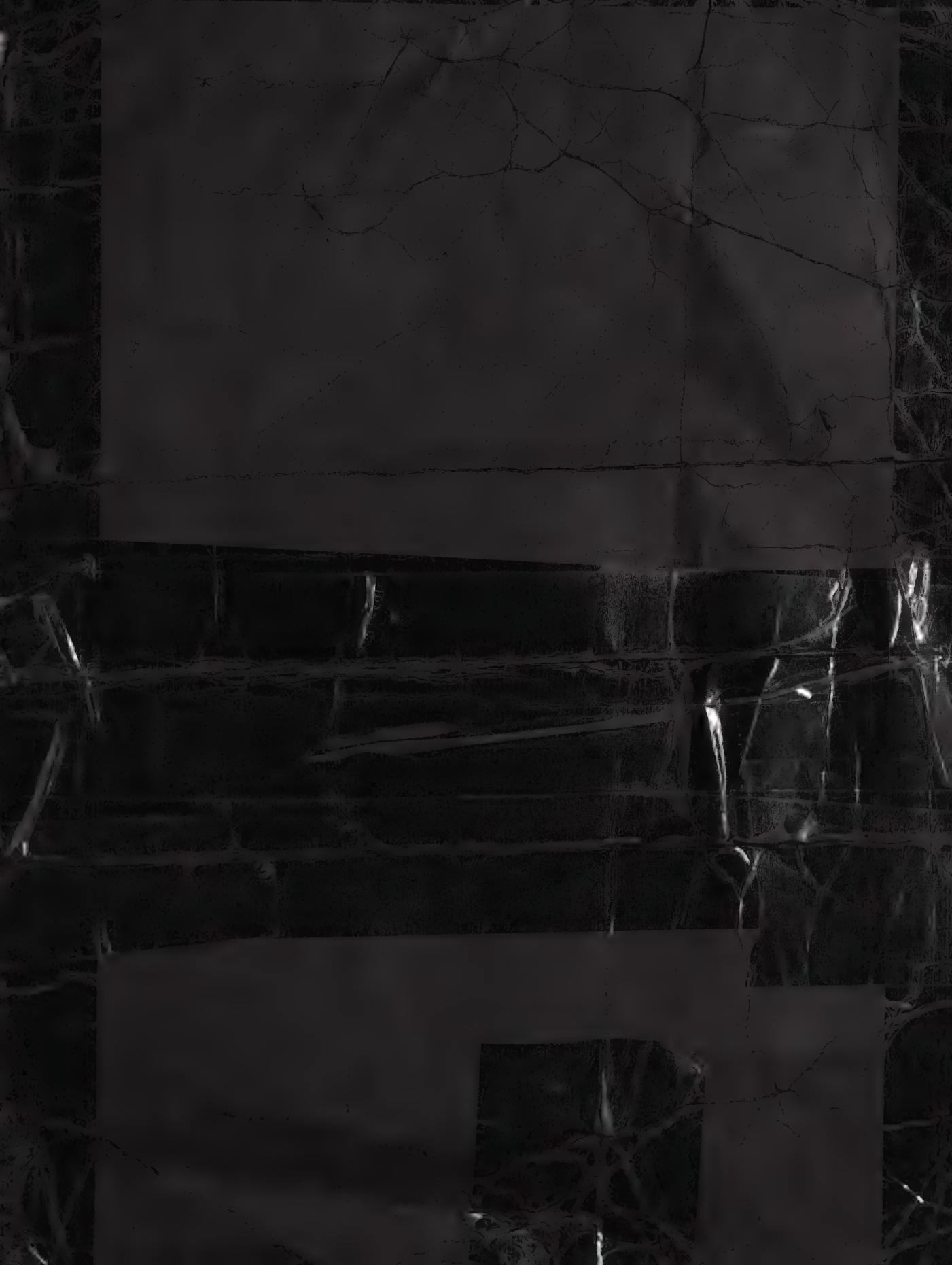


Figure 7—1. Model 44-30 Remote Display



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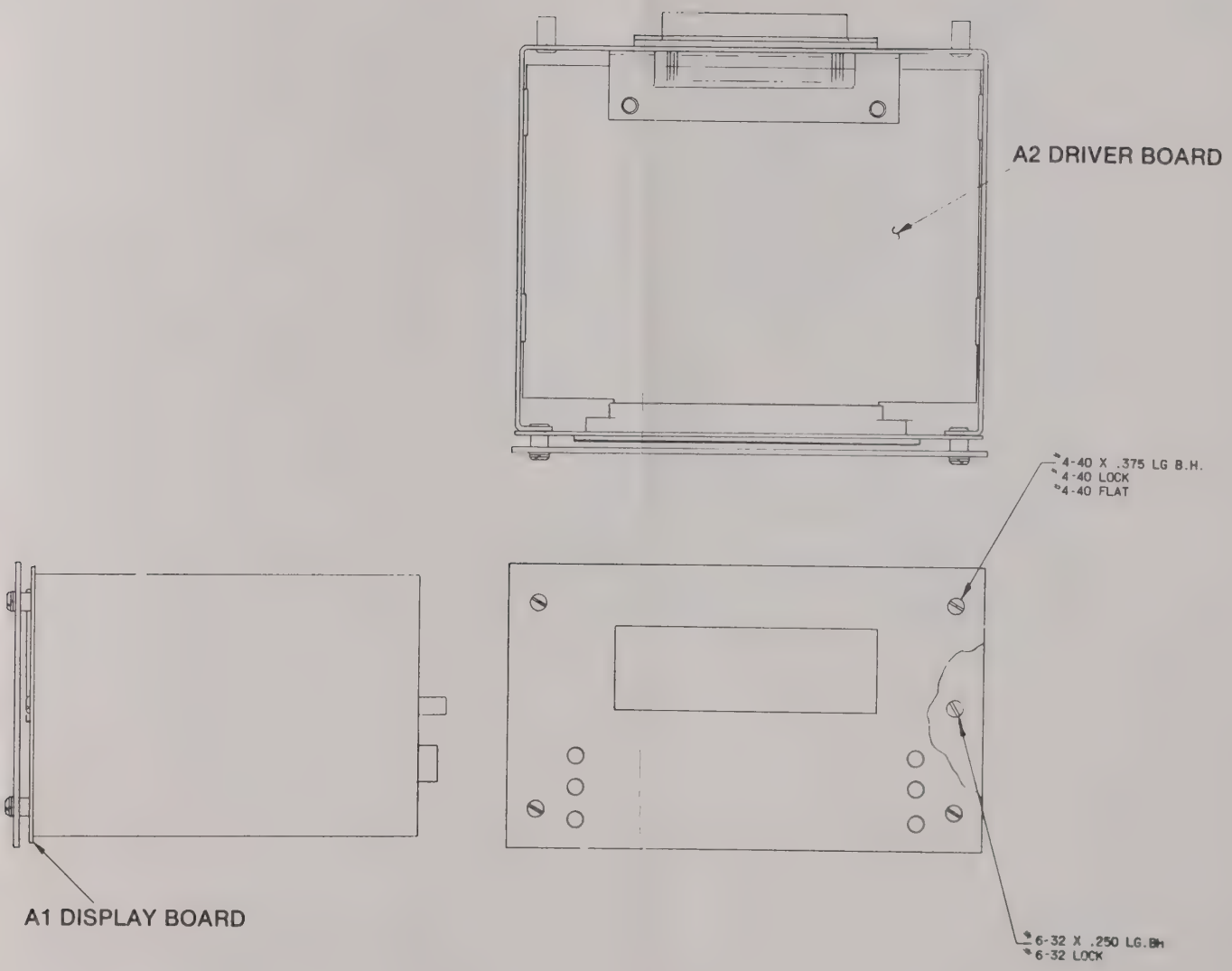
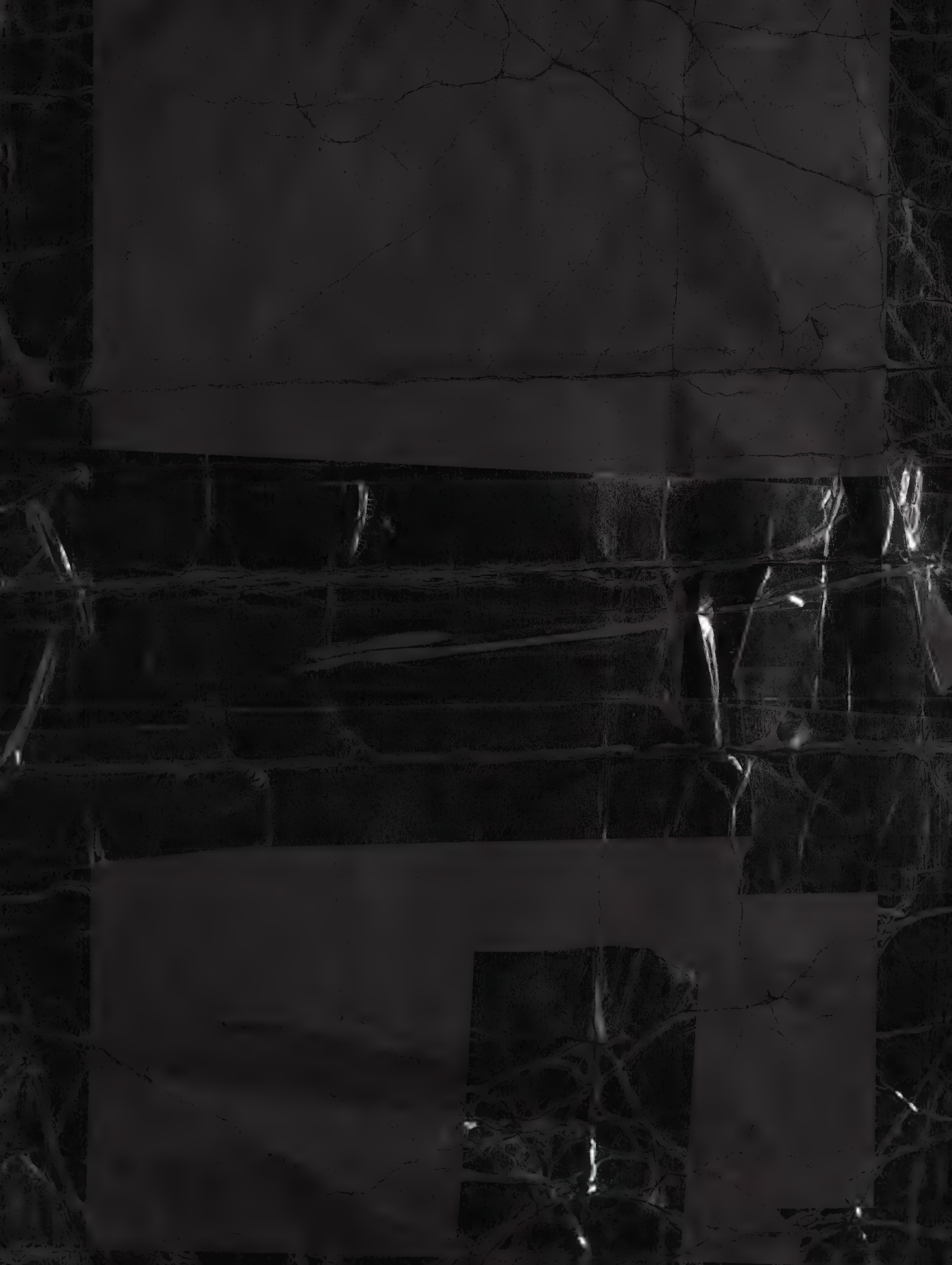
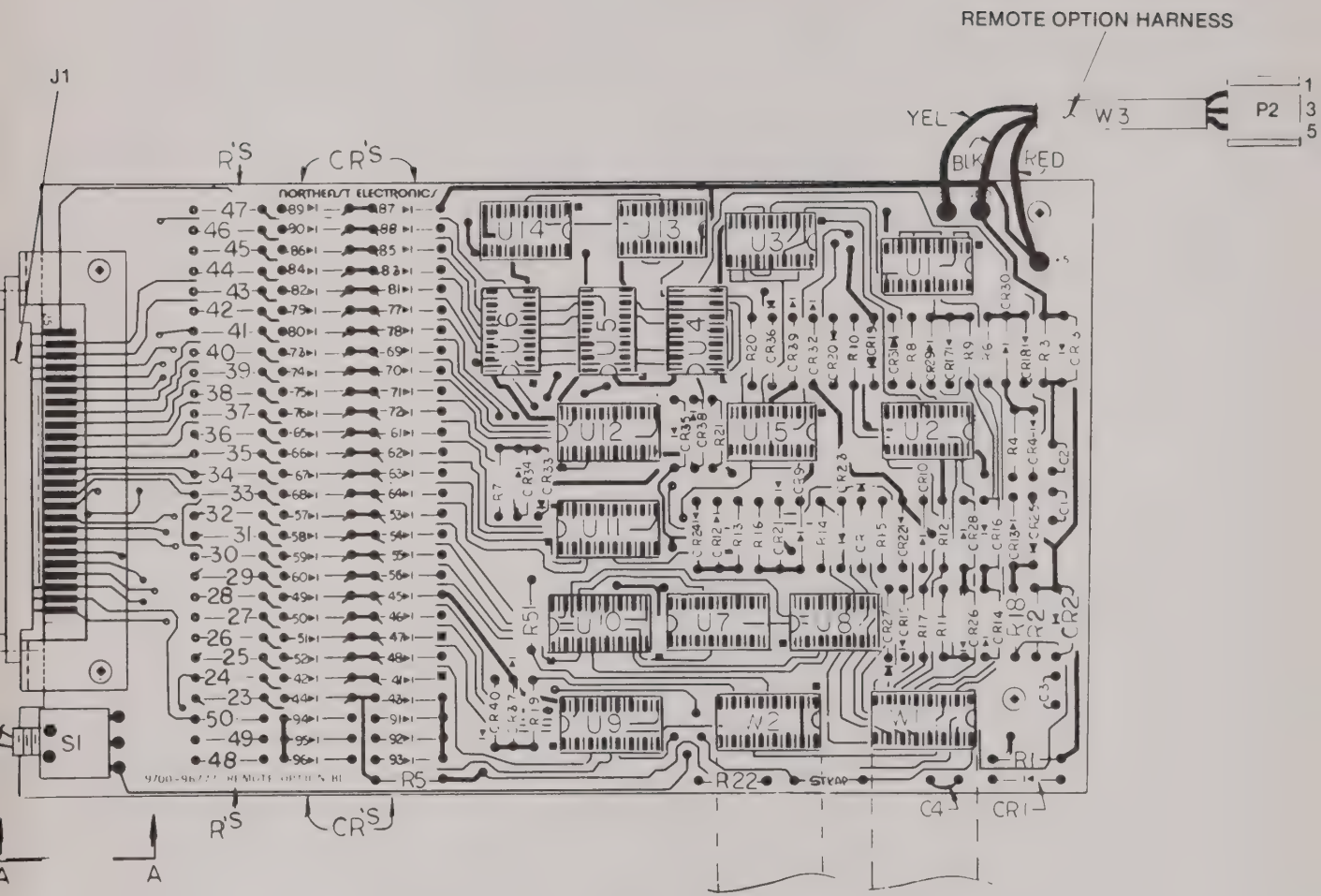
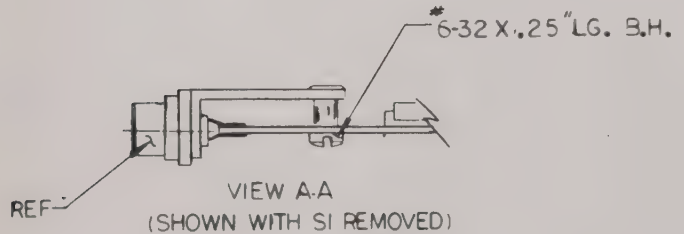


Figure 7—2. Model 44-30 Overall Assembly



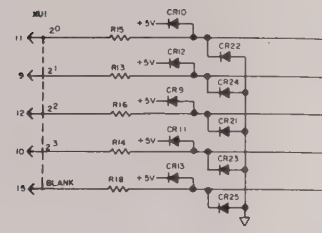


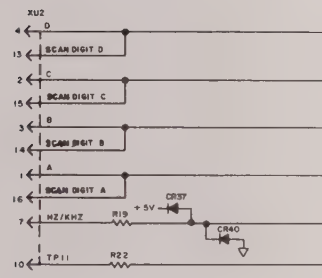


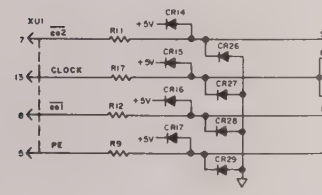
REMOTE OPTION BOARD	
NE PART NO.	C0044-30-010
REF DESIG	A3
PC NO.	96777

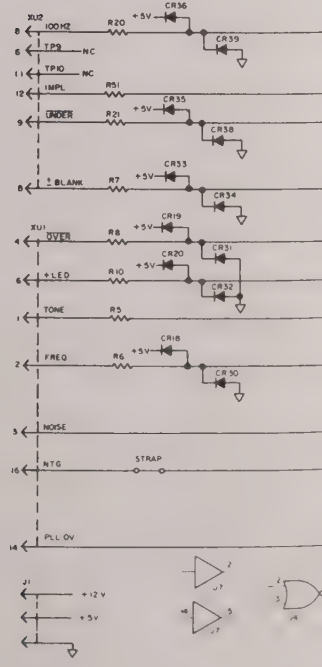
WIRE LIST FOR W3				
COLOR	GA	FROM	TO	MARKER
RED	22	P2.5	+5	1
YEL	22	P2.3	−12	2
BLK	22	P2.1	GND	3

Figure 7−3. Remote Option Board, Parts Location Diagram









IC POWER SUPPLY CONNECTIONS			
IC	TYPE	+5V	GND
U1	CD4011	14	7
U2	CD4001	14	7
U3	CD4011	14	7
U4	CD4001	14	7
U5	CD4001	14	7
U6	CD4001	14	7
U7	CD4050	1	8
U8	CD4001	14	7
U9	CD4042	16	8
U10	CD4042	16	8
U11	CD4042	16	8
U12	CD4042	16	8
U13	CD4013	14	7
U14	CD4013	14	7
U15	CD4013	14	7

HIGHEST REFERENCE DESIGNATIONS		
R51	C4	CR96
U15		

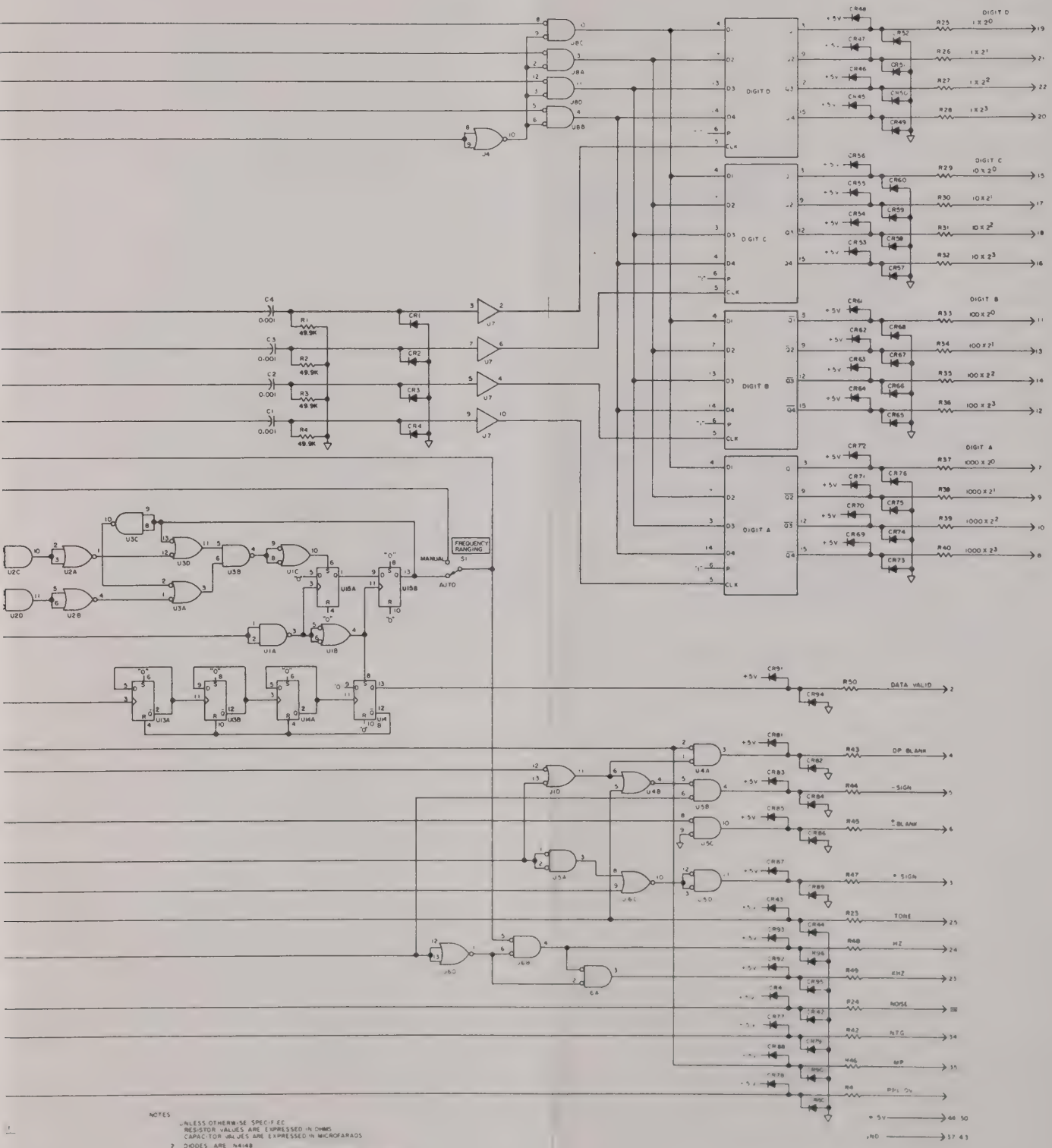
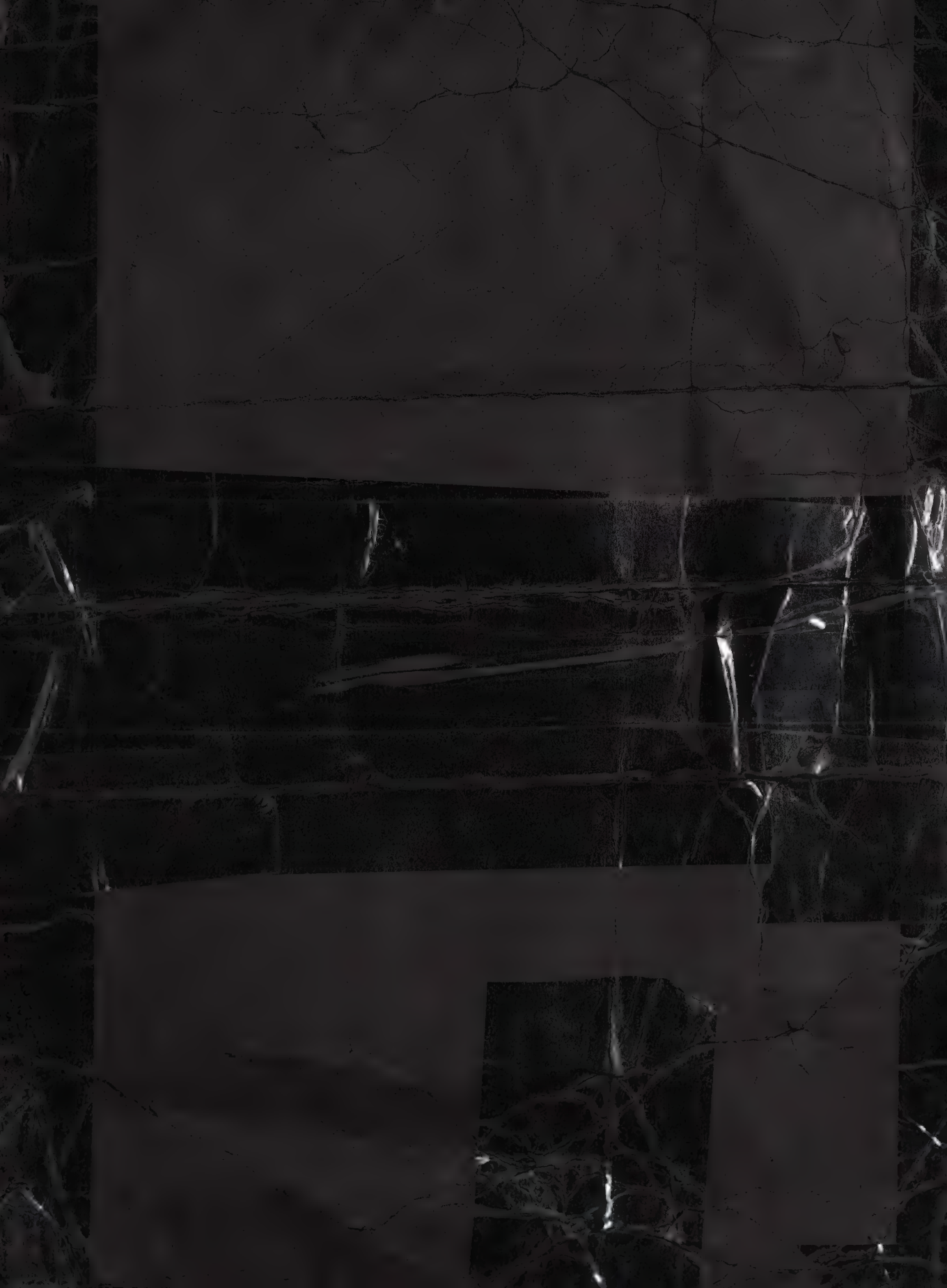
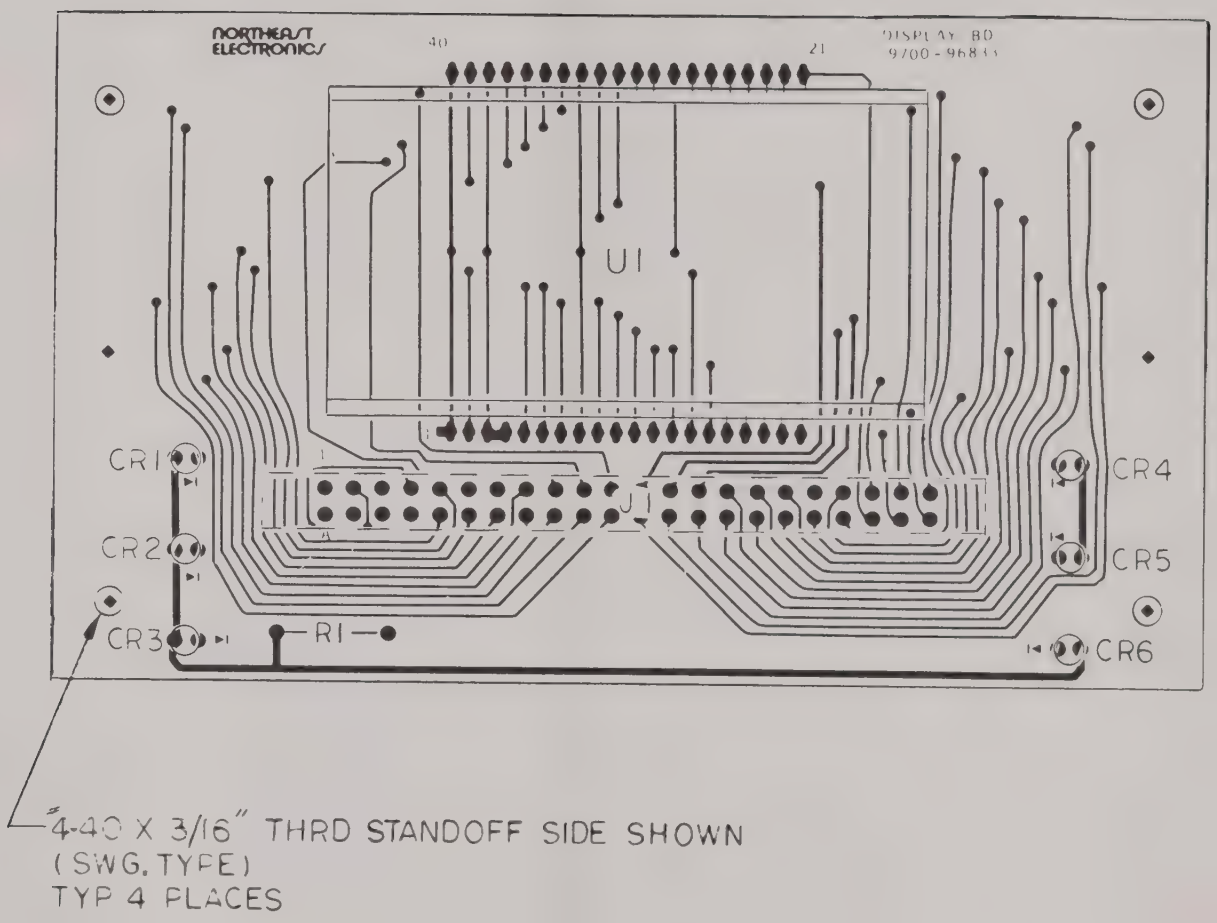


Figure 7—4. Remote Option Board, Schematic Diagram





DISPLAY BOARD	
NE PART NO.	C0044-30-011
REF DESIG	A1
PC NO.	96833

Figure 7—5. Display Board, Parts Location Diagram

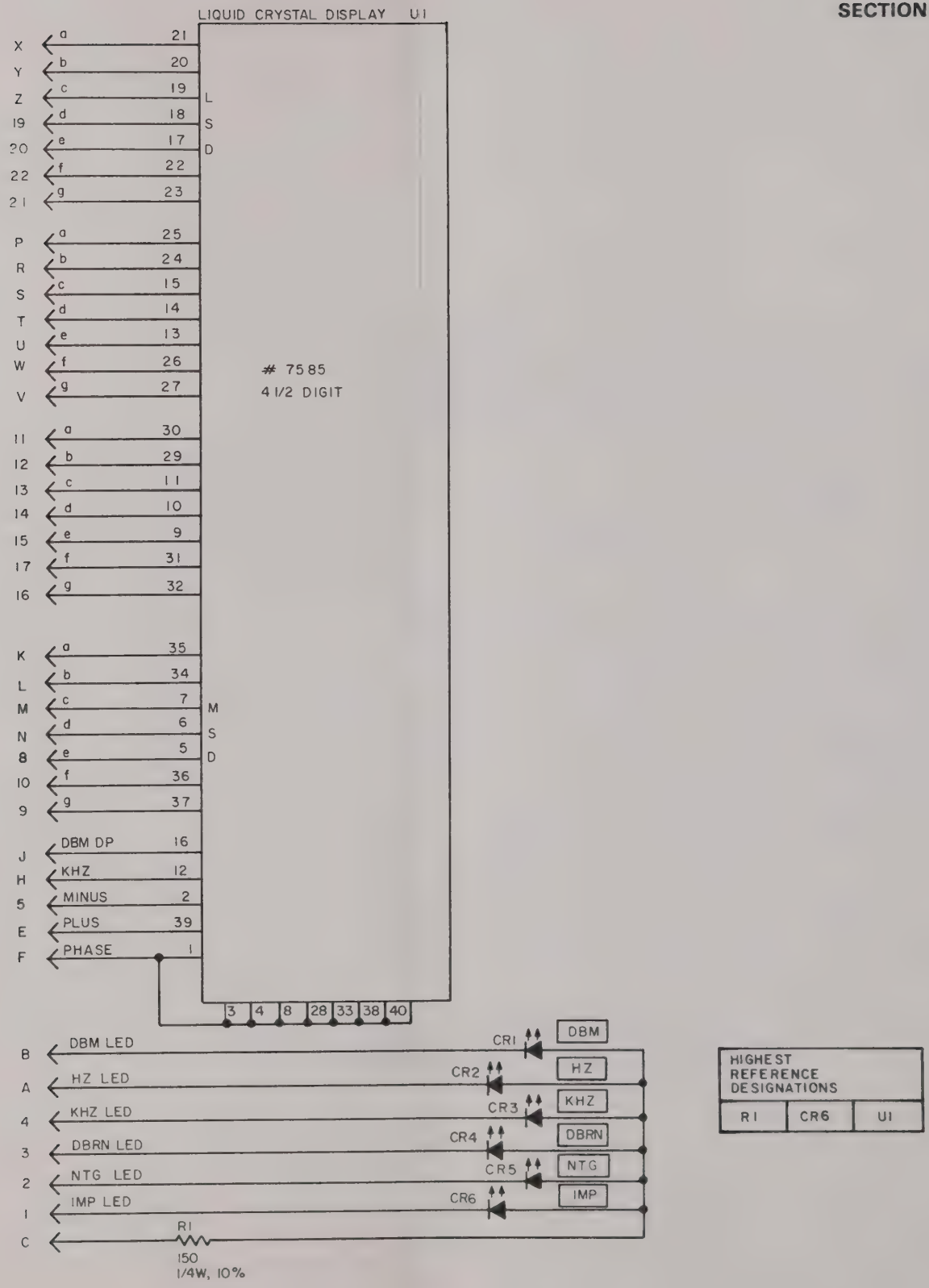
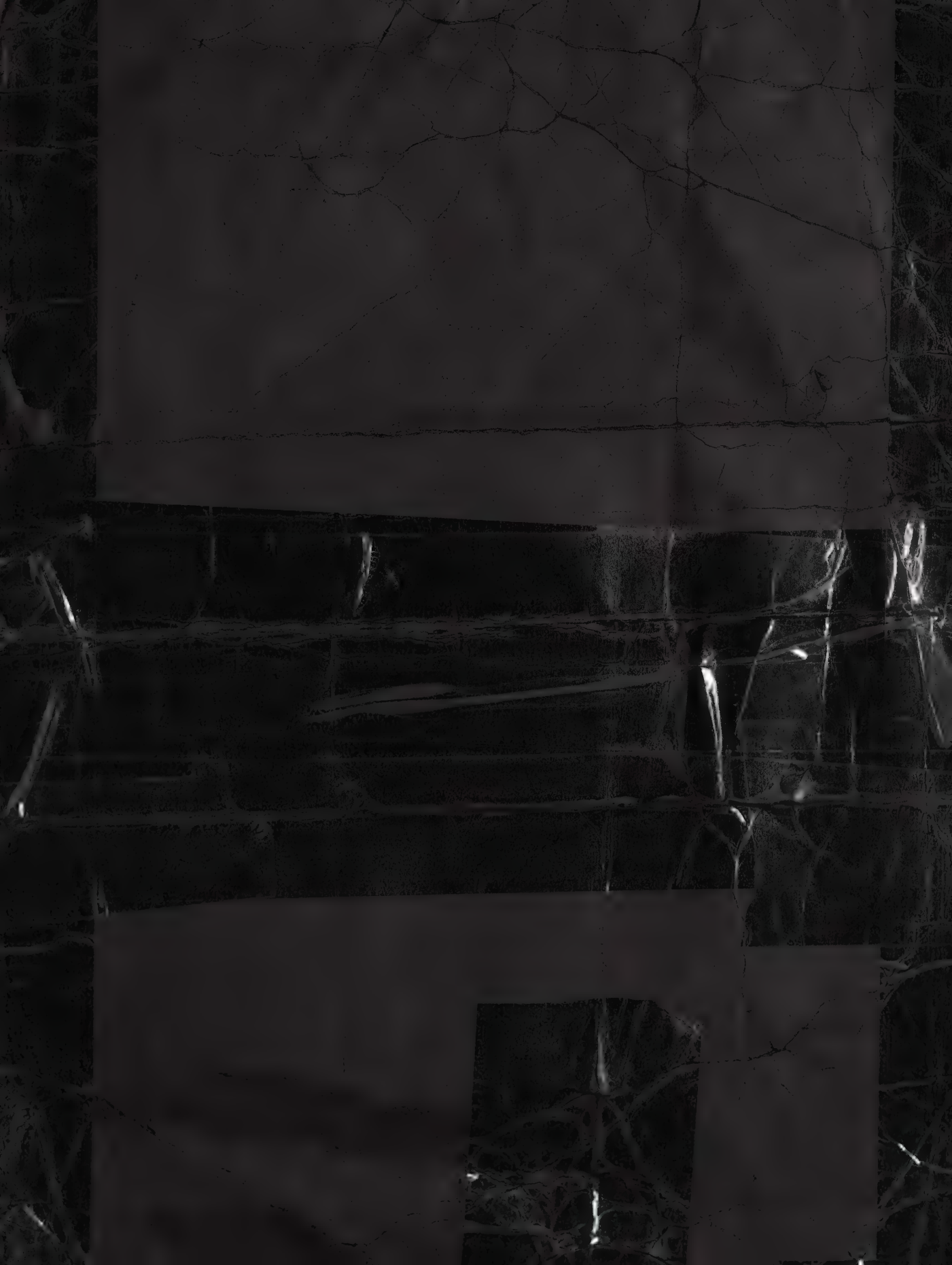
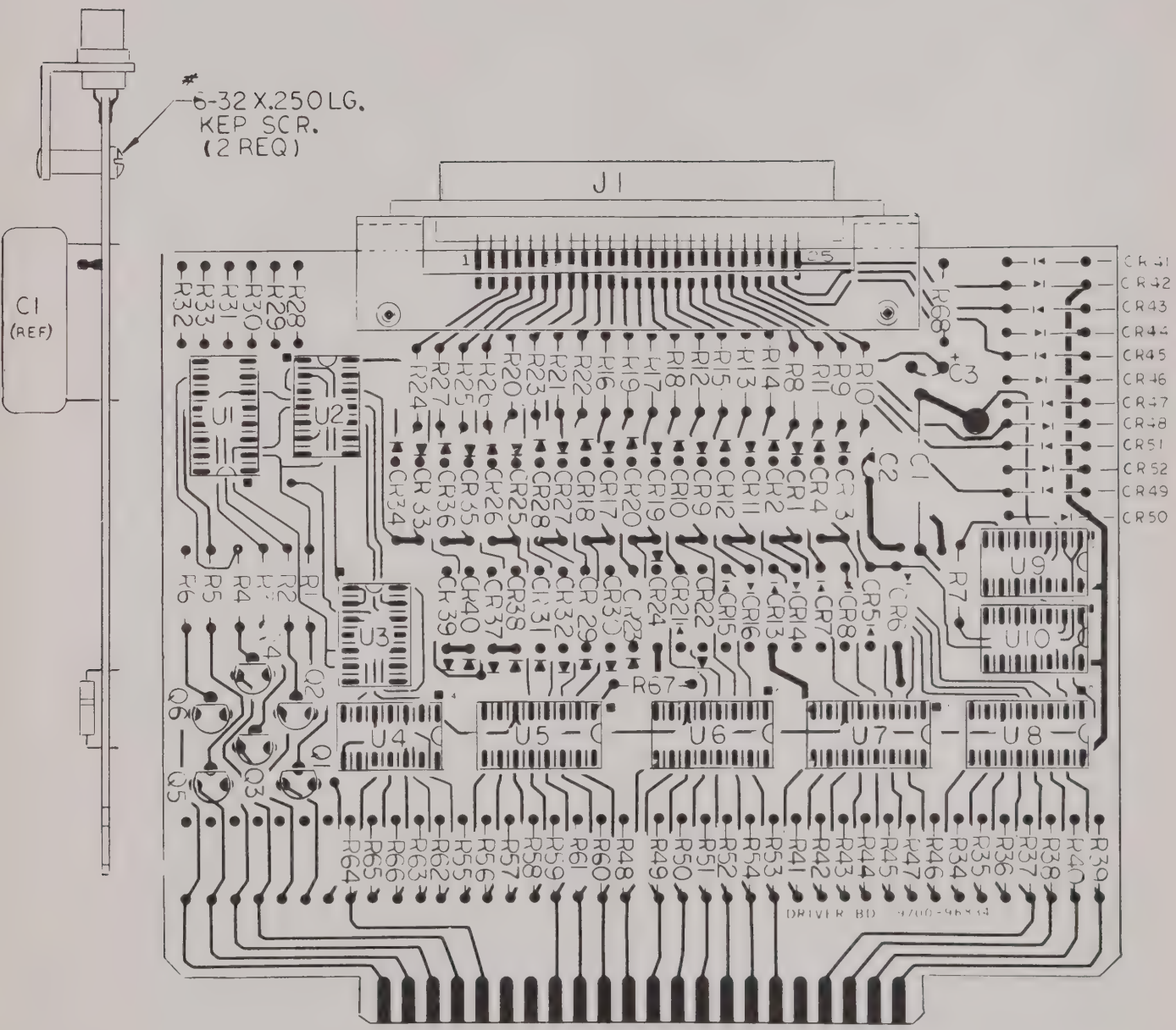


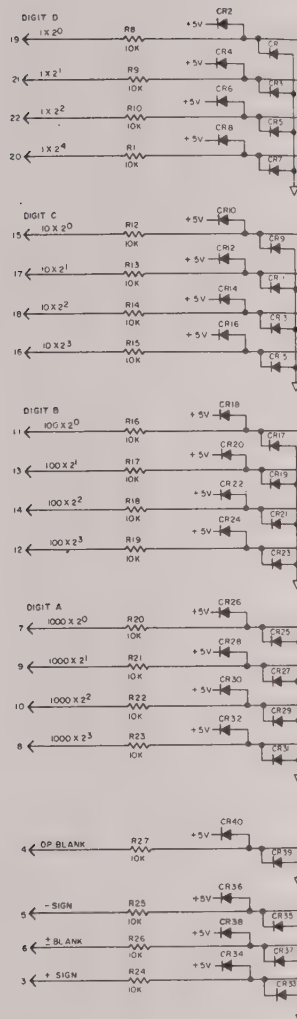
Figure 7—6. Display Board, Schematic Diagram





NE PART NO.	C0044-30-012
REF DESIG	A2
PC NO.	96834

Figure 7—7. Driver Board, Parts Location Diagram



I.C POWER SUPPLY CONNECTIONS			
C	TYPE	+5V	GND
U1	CD4050	16	8
U2	CD4011	14	7
U3	CD4011	14	7
U4	CD4030	14	7
U5	CD4055	16	8
U6	CD4055	16	8
U7	CD4055	16	8
U8	CD4055	16	8
U9	CD4011	14	7
U10	CD4013	14	7

HIGHEST REFERENCE DESIGNATIONS		
R68	C3	CR52
Q6	U10	

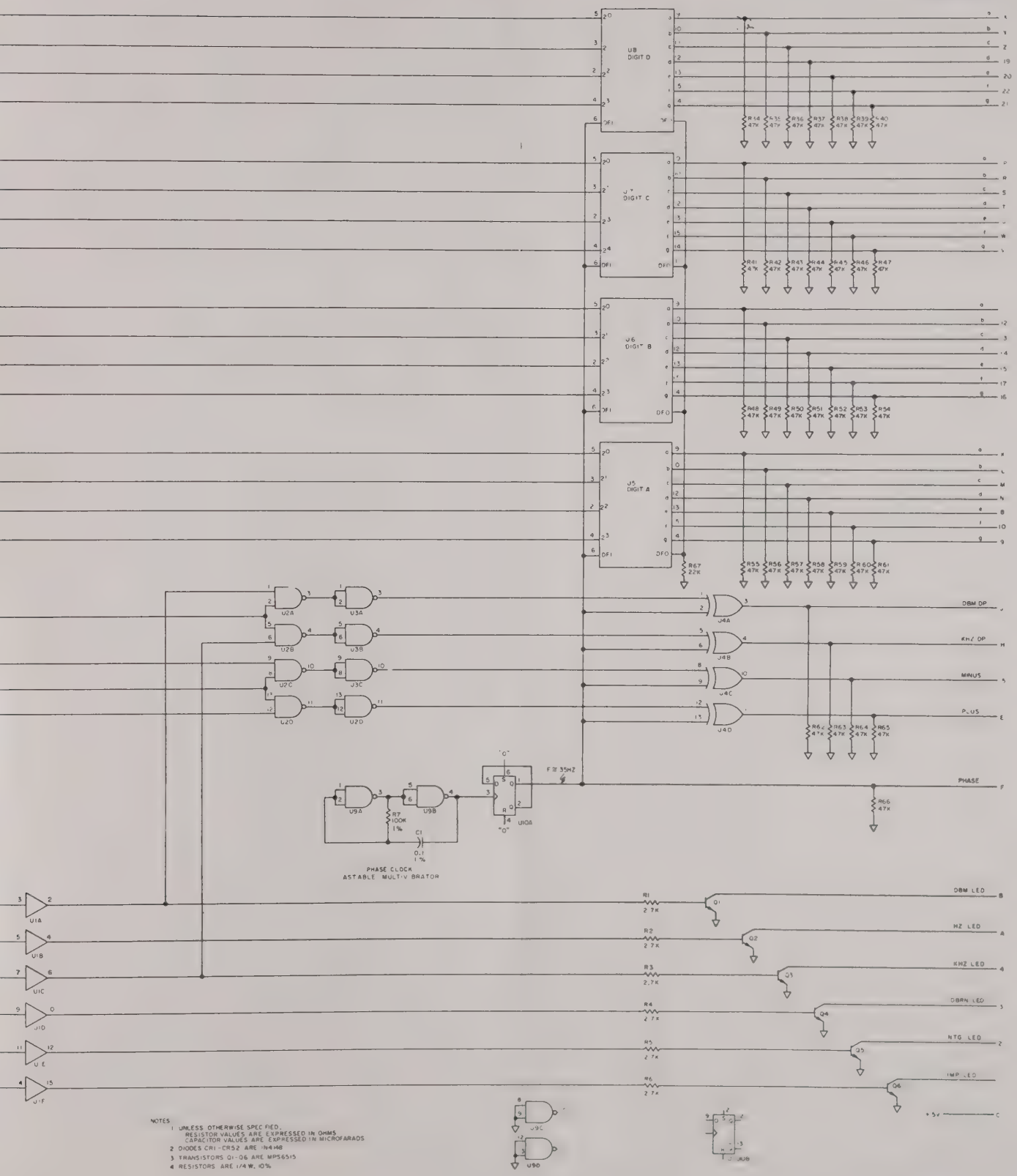


Figure 7—8. Driver Board, Schematic Diagram

SECTION 8

PARTS LIST

8.1 This section contains parts lists for the Model 44-30 Remote Display. The assembly diagrams and parts location diagrams in Section 7 show where individual parts are used within the remote display.

Table 8—1. Model 44-30 Remote Display Parts List

REFERENCE DESIGNATOR	DESCRIPTION VALUE	POWER	TOL	VOLTS	MFGR.	MFGR. PART NO.	N.E. PART NO.
A3	PC 96777 REMOTE OPT. BD						A004430010
MP1	CASE WELDMENT						A004430200
MP2	HANGER BRACKET ASSY						A008630019
UNIT	O/A ASSY MODEL-44RD						A004430001
W1	REMOTE INTERCON. CABLE						A004430017

Table 8—2. Model 44-30 Overall Assembly Parts List

REFERENCE DESIGNATOR	DESCRIPTION VALUE	POWER	TOL	VOLTS	MFGR.	MFGR. PART NO.	N.E. PART NO.
A1	PC 96833 DISPLAY BD						A004430011
A2	PC 96834 DRIVER BD						A004430012

Table 8—3. Remote Option Board Parts List

REFERENCE DESIGNATOR	DESCRIPTION VALUE	POWER	TOL	VOLTS	MFGR.	MFGR. PART NO.	N.E. PART NO.
C1-4	1000PF		20%	200V	VITRAMON	VK23BW1D2M	331001020
CR1-4	DO35 4NS 10MA	SI	50UA		FAIRCHILD	IN4148	560041480
CR9-96	DO35 4NS 10MA	SI	50UA		FAIRCHILD	IN4148	560041480
J1	CONN,50PIN CHAMP,EDGE MTG				AMP	552130-1	654002800
R1-4	49.9K	1/8W	1%		ELECTRA	RN55 SIZE 100 PPM	220249921
R5-51	10K	1/4W	10%		2	00 A410100015R71-7	200101036
S1	SPDT	5A		28V	C+K	7101A	620600900
U1	14DIP-P	B			CMOS RCA	CD4011	510004011
U2	14DIP-P	B			CMOS RCA	CD4001	510004001
U3	14DIP-P	B			CMOS RCA	CD4011	510004011
U4-6	14DIP-P	B			CMOS RCA	CD4001	510004001
U7	16DIP-P	B			CMOS RCA	CD4050	510004050
U8	14DIP-P	B			CMOS RCA	CD4001	510004001
U9-12	16DIP-P	B			CMOS RCA	CD4042	510004042
U13-15	14DIP-P	B			CMOS RCA	CD4013	510004013
W1-2	HARNESS SHEET#5						A004400018
W1-2	W1 & W2 CABLE ASSY						A004430018
W3	OPT HARNESS CABLE, HC						A004430019

Table 8—4. Display Board Parts List

REFERENCE DESIGNATOR	DESCRIPTION VALUE	POWER	TOL	VOLTS	MFGR.	MFGR. PART NO.	N.E. PART NO.
CR1-6		10 MA			H.PACKARD	5082-4658	564500801
J1	TYPE 1F	22 DUAL MIL BLWS			AMPHENOL	225-22221-110	651701200
R1	150-	1/4W	10%		AB	TYPE CB	200101516
U1	4-1/2DIGIT,.8IN HIGH LCD				L.X.D. INC	85DW2R11	728301800

Table 8—5. Driver Board Parts List

REFERENCE DESIGNATOR	DESCRIPTION VALUE	POWER	TOL	VOLTS	MFGR.	MFGR. PART NO.	N.E. PART NO.
C1	.1UF		2%	100V	F-DYNE	PS-11-.1-100-2	321501040
C2	.01UF	Z5UTC GMV		1KV	CENTRALAB	DD-103	330101030
C3	4.7UF	B	20%	35V	SPRAGUE	196D475X0035JA1	310804750
CR1-52	D035 4NS 10MA	SI	50UA		FAIRCHILD	1N4148	560041480
J1	CONN,50PIN CHAMP,EDGE MTG				AMP	552130-1	654002800
Q1-6	TO-92 350MW TA	NPN		25V	MOTOROLA	MPS6515	550065150
R1-6	2.7K	1/4W	10%		AB	TYPE CB	200102726
R7	100K	1/8W	1%		ELECTRA	RN55 SIZE 100 PPM	220210031
R8-33	10K	1/4W	10%		AB	TYPE CB	200101036
R34-67	47K	1/4W	10%		AB	TYPE CB	200104736
R68	10K	1/4W	10%		AB	TYPE CB	200101036
U1	16DIP-P	B		CMOS	RCA	CD4050	510004050
U2-3	14DIP-P	B		CMOS	RCA	CD4011	510004011
U4	14DIP-P	B		CMOS	RCA	CD4030	510004030
U5-8	16DIP-P	B		CMOS	RCA	CD4055	510004055
U9	14DIP-P	B		CMOS	RCA	CD4011	510004011
U10	14DIP-P	B		CMOS	RCA	CD4013	510004013

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CHANGE NOTICE SUMMARY

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